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# **A COTTON STRIPPER WITH AIR-BELT CONVEYORS**

**For Harvesting Variable Row-  
Width Research Plots**

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## ACKNOWLEDGMENTS

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# A COTTON STRIPPER WITH AIR-BELT CONVEYORS

## For Harvesting Variable Row-Width Research Plots

By James A. Friesen,<sup>1</sup> I. W. Kirk,<sup>2</sup> and A. D. Brashears<sup>1</sup>

Interest in short-season and variable row-width cotton culture has created a need for a plot harvester to be used in research on narrow-row cultural practices. Plot harvesters have been developed for spindle cotton harvesters<sup>3</sup> and roll stripper harvesters,<sup>4</sup> both of which do an excellent job of harvesting plots. Their advantage is that they can harvest research

plots by standard commercial methods, while providing for separate handling by plots and samples.

The harvester described here differs from earlier models in that the entire unit is mounted on a tractor. It employs a harvesting principle similar to that described by Kirk, Hudspeth, and Wanjura.<sup>5</sup> Fingers 36 inches long, of 1- by 1- by 3/16-inch angle iron, spaced one-half inch apart, were used to make a stripping head 80 inches wide (fig. 1). The stalk walker is a smooth 2-inch-diameter pipe and is unpowered. A finger kicker moves the cotton from the stripper fingers into a conveying auger. The auger has two left-right conveying sections that separate the material in the center of the conveying head and move it to auger-mounted rubber paddles, which feed the material into two separate air-belt convey-

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<sup>3</sup> Clayton, J. E., Hoston, J. T., Jr., and Wooton, O. B. 1963. Two mechanical-picker attachments for harvesting cotton research plots. U.S. Dep. Agric., Agric. Res. Serv. [Rep.] ARS 42-85, 11 pp.

<sup>4</sup> Brashears, A. D., and Ray, L. L. 1966. Cotton stripper for harvesting research plots. U.S. Dep. Agric., Agric. Res. Serv. [Rep.] ARS 42-122, 5 pp.

<sup>5</sup> Kirk, I. W., Hudspeth, E. B., Jr., and Wanjura, D. F. 1964. A broadcast and narrow-row cotton harvester. Tex. Agric. Exp. Stn. Prog. Rep. 2311, 4 pp.

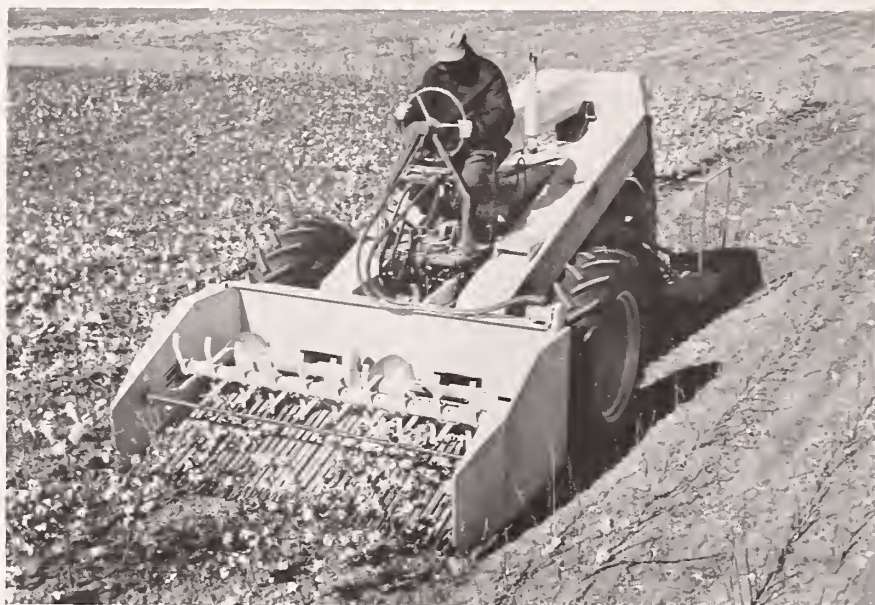


FIGURE 1.—Variable row-width plot harvester.

ors. The kicker and auger are powered by a hydraulic motor mounted on the header and supplied by a pump on the tractor power takeoff.

Air-belt conveyors are used to carry the seed cotton from the stripping head to the sackers. The application of such conveyors for moving seed cotton was investigated by Baker and Stedronsky.<sup>6</sup> They have the advantages of (1) having no moving parts except supply fan, (2) being self-cleaning between plots, and (3) operating at low conveying speed, thus minimizing impact damage to material. The main disadvantage

of the air belt is the limited slope up which material can be moved.

The conveyors are 12 inches wide and 8 inches deep, with a 3-inch air plenum. Die-stamped louvers were cut in the 14-gage sheet-metal bottom of the conveyor to vent air inward. A cross section of a typical louver is shown in figure 2. The louvers are 5 inches wide, with the opening being approximately one thirty-second of an inch. Two staggered rows of louvers were stamped on 6-inch centers as shown in figure 2. To start the material flowing in the conveyor, a slot approximately one-fourth inch deep and the full width of the conveyor was made at the bottom of the air belt, as shown in the insert in figure 3.

Air is supplied to the plenums by a centrifugal fan, which devel-

<sup>6</sup> Baker, Roy V., and Stedronsky, Victor L. 1968. Seed cotton and cottonseed handling with air-jet conveyors. U.S. Dep. Agric., Agric. Res. Serv. [Rep.] ARS 42-143, 18 pp.

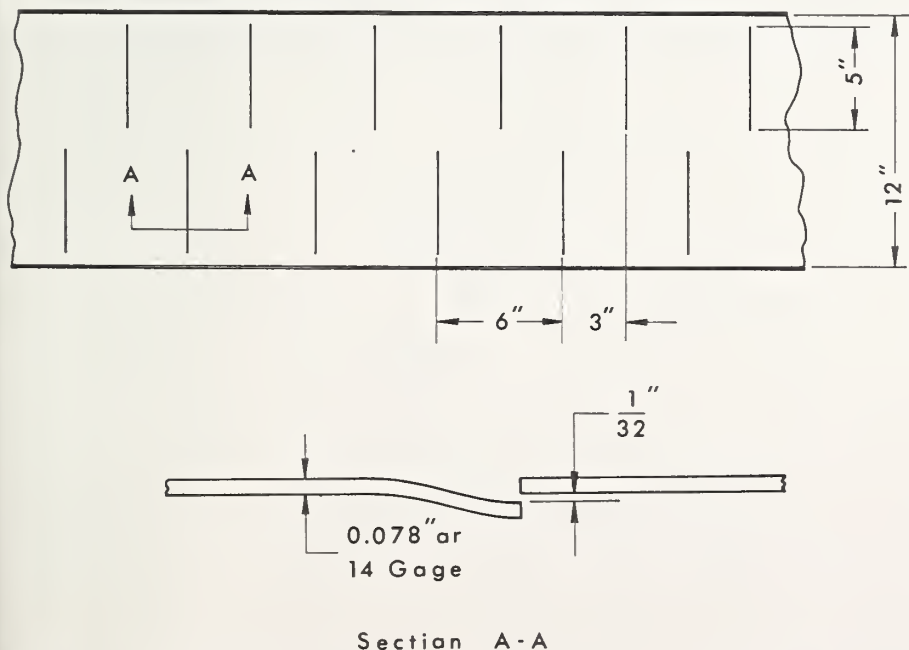
ops a static pressure at the plenum of 11.6 inches of water. This pressure produces an air velocity of about 10,800 ft/min at the orifice of the louver and 3,000 ft/min one-half inch above the bottom. Air velocity then drops off to an average of 700 ft/min in the middle and upper portions of the duct.

A later model of an experimental harvester was built with a duct of the same dimensions, but with 1/16-inch openings in the louvers. With openings of this size, the plenum air pressure is reduced to 4.6 inches of water, reducing the power required to operate the supply fan. The characteristics of the high-velocity air cushion near the bottom of the belt are also altered; its velocity is reduced and its depth increased, which appears

to improve its conveying characteristics for seed cotton.

The harvester can remove a limited amount of trash. Round 3/8-inch bars on 3/4-inch centers run parallel to and under the conveying portions of the auger, allowing for dirt and some leaf trash removal. Grates made up of 1/4-inch bars on 5/8-inch centers at the air-belt exits allow some fine light trash to escape (fig. 3). No provision for green boll separation is made.

This harvester was designed to harvest one 80-inch-wide plot or two adjacent 40-inch-wide plots. Since the harvested cotton is fed into separate conveyors, the material from the two sides can either be sacked separately or fed into a single sack (fig. 4).



Section A-A

FIGURE 2.—Configuration of slots in the bottom of the air belt and a cross section of a slot.



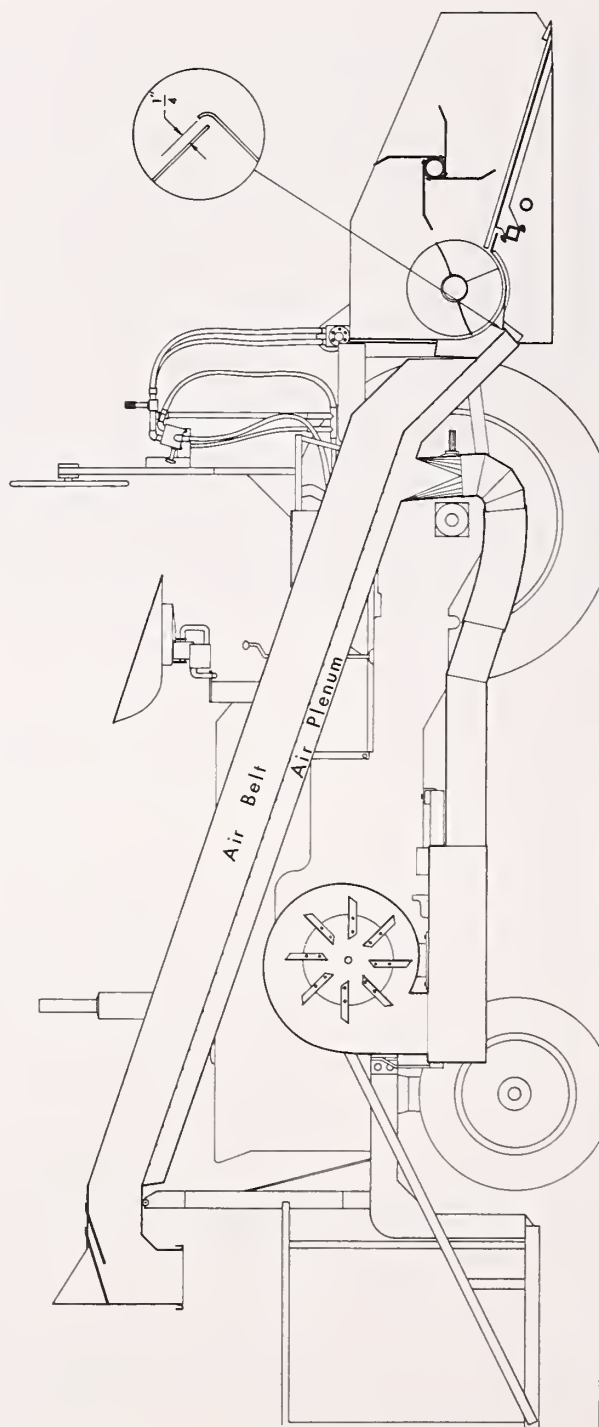


FIGURE 3.—Cross-sectional side view of variable row-width harvester.





FIGURE 4.—Rear view of variable row-width plot harvester, showing sacking attachment.

During the 1971 and 1972 harvesting seasons this harvester was used with no major difficulties. It has provided a method of harvest-

ing variable row-width research plots with an efficiency comparable to that obtained with commercially built finger harvesters.

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